imaging of the hips allows comparison of right and left hip activities. Perfusion is considered absent if activity in the region of the femoral neck is below adjacent body background, probably present if activity equals background, and normal for increased activities. Bone activity is considered normal if activity in the region of the femoral head is equal to, or only slightly greater than, surrounding bone activity. Abnormal activity may be less than, or distinctly greater than, surrounding bone activity. Changes from a baseline value are also considered significant.

Infarcted bone undergoes a sequence of changes. Acutely there is simply the avascularity (negative area on bone scan); after several days there is an increasing osteoblastic reactivity surrounding the ischemic-avascular bone (bone scans become increasingly positive) over a period of weeks. The BM image shows decreased perfusion of the neck during the entire sequence. If revascularization occurs, commonly seen in Legg-Perthes disease, the BM study will show increasing activity and the bone study will return to normal.

Therefore, in patients with chronic avascular necrosis there will be a negative BM image and a positive bone image. This pattern would be expected also with trauma, sickle cell crises and tumors (and probably osteomyelitis). On the other hand, in a patient with osteoarthritis, frequently the major differential diagnosis in hip pain, there will be parallel changes in bone and BM activity, both increasing if there is active inflammation, both decreasing if there is relative disuse of the involved joint.

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Serum Ferritin

FERRITIN, the second most abundant iron protein in the body, can be measured in serum by means of a radioimmunoassay. Serum levels are proportional to the size of the body iron stores. They are more accurate indicators of iron deficiency than serum levels of iron or iron binding capacity or bone marrow aspirates stained for hemosiderin. As expected, mean values are higher in men than in women, but in either case—and regardless of age—serum values under 12 ng per ml are almost invariably diagnostic of iron deficiency. Levels above 50 ng almost always exclude iron deficiency in the differential diagnosis of anemias. Each ferritin molecule is thought to consist of a ferric iron hydroxide phosphate core and a protein shell with a molecular weight of about 450,000. Found mainly in the cytoplasm of reticuloendothelial and liver cells, it is assumed to be an iron storage protein and regulator of iron metabolism. From a practical standpoint, the finding of an elevated serum ferritin level in an anemic patient would exclude iron deficiency and might obviate the need for bone marrow examination.

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Lung Scanning and the Detection of Pulmonary Emboli

Combined 81m-Krypton Ventilation/99m-Tc-macroaggregate Perfusion Scintigraphy

INTRAVENOUSLY INJECTED PARTICLES whose diameters range from 15 to 50 μ are carried through the right atrium and ventricle, and distribute themselves over the lung capillaries according to blood flow distribution. In the capillaries they remain trapped for an average of 30 minutes to 4 hours. If the particles are labeled with a gamma emitting isotope, the distribution of the blood flow to the lungs can be estimated by scintigraphy. therefore, perfusion abnormalities can be detected as "defects" in the scintigram.

But do perfusion defects represent pulmonary emboli? Not always, and the question has been argued with some passion over the years. Normal findings on perfusion scintigraphy almost eliminate the chance that a pulmonary embolism will be found, but all perfusion defects are not indicative of the presence of pulmonary emboli. On pulmonary angiography, emboli will be found respectively in 81 percent, 50 percent and 9 percent of cases with lobar, segmental and subsegmental defects shown on the perfusion scan. The specificity of the test increases if it can be shown that the corresponding lung lesion has a normal ventilation. In those cases the probability of finding emboli by angiography becomes 94 percent,